

一种适用于大区域稀疏控制点下的机载InSAR定标方法

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A Calibration Method for Airborne InSAR Applied to Large Areas with Sparse GCPs

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摘要

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摘要 高精度的高程测量需要通过干涉定标来对InSAR系统干涉参量误差进行校正, 传统干涉定标方法需要较多控制点来降低系统随机误差对定标精度的影响, 而对于复杂地形区域, 野外布设控制点难度较大, 部分区域可能只有少数控制点甚至没有控制点, 对于这些区域传统干涉定标方法不再适用, 该文提出了一种新的基于区域网平差理论的机载InSAR定标方法, 该方法将摄影测量学中的区域网平差理论引入到InSAR系统定标处理中, 通过对多条带进行联合定标处理可以实现大区域稀疏控制点下InSAR系统参量定标, 而且解决了传统定标方法导致的条带间重叠区域高程不一致问题。最后, 通过对丘陵区域3条带仿真数据进行区域联合定标处理, 验证了该方法的有效性和合理性。

关键词: 机载InSAR 干涉定标 稀疏控制点 区域网平差

Abstract: High-precision height acquisition needs to correct the interferometric parameters errors by interferometric calibration for Interferometric SAR (InSAR) system. The traditional interferometric calibration method needs more Ground Control Points (GCPs) to reduce the influence of systematic random errors to the calibration precision, but it is very difficult to dispose GCPs in the field with complicated terrains, some areas probably only have little GCPs or even no GCPs and the traditional interferometric calibration method is inapplicable to this situation. A new calibration method is proposed for airborne InSAR based on block adjustment, which introduces the block adjustment theory in Photogrammetry to the processing of InSAR system calibration, through the joint multi-strip processing the method can be used to calibrate the interferometric parameters for airborne InSAR applied to large areas with sparse GCPs. Moreover, the problem of inconsistent height in the overlapping areas caused by the traditional calibration method is also solved. Finally, a joint calibration is adapted to the simulative data of three strips from the highland and the results confirm the validity and rationality of the proposed method.

Keywords: Airborne Interferometric SAR (InSAR) Interferometric calibration Sparse Ground Control Points (GCPs)

Block adjustment

Received 2010-11-04;

本文基金:

国家自然科学基金重大项目(60890070)资助课题

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引用本文:

胡继伟, 洪峻, 明峰, 张林涛. 一种适用于大区域稀疏控制点下的机载InSAR定标方法[J] 电子与信息学报, 2011, V33(8): 1792-1797

Hu Ji-Wei, Hong Jun, Ming Feng, Zhang Lin-Tao. A Calibration Method for Airborne InSAR Applied to Large Areas with Sparse GCPs[J], 2011, V33(8): 1792-1797

链接本文:

<http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2010.01175> 或 <http://jeit.ie.ac.cn/CN/Y2011/V33/I8/1792>

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